**CLIMATE NARRATIVE, November 2018**

**WEST COAST OF UNITED STATES AND NORTH PACIFIC**

During November 2018, the homogenous distribution of weak positive sea surface temperature (SST) anomaly across the North Pacific appeared to be breaking down. Seasonal SST means off southern California, northern California and southern Oregon were above average (<2°C). Below average SST appeared off Central California between Monterey Bay and Point Arena (>-1.5°C). Negative SST anomalies (>-1.5°C) were found along the coasts of Mexico and the US. Positive SST anomalies (< 2°C) occurred in the Gulf of Alaska and between 30°-50°N west of 180°E/W.
http://www.ospo.noaa.gov/Products/ocean/sst/anomaly/
https://coastwatch.pfeg.noaa.gov/elnino/coastal_conditions.html
Positive **Sea Level Anomaly** (SLA), to 10 centimeters (cm,) was seen across the equatorial Pacific and along the coast of north America. The trans-Pacific trough of negative SLA (>-2 cm) with zonal axis near 10°N persisted through November, deepening and expanding west of 180°E/W. The Pacific between 20°-40°N had extensive areas of negative SLA in the east and extensive areas positive SLA west of 180°E/W.
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ocean/weeklyenso_clim_81-10/wksl_anm.gif
During November, **Chorophyll-a** (Chl-a) at 2 milligrams per cubic meter ($mg/m^3$) persisted in 200-500 km wide coastal areas from Point Conception poleward past Vancouver Island, with areas exceeding 3 $mg/m^3$ in localized inshore areas.
Areas with Chl-a less than 0.1 $mg/m^3$ occurred 700-1000 kilometers southwest of California. https://coastwatch.pfeg.noaa.gov/coastwatch/CWBrowserWW180.jsp#

At the **Cape San Martine Data Buoy** (46028), off Central California (35.7°N), the monthly mean temperature for November is, 14.1-14.4°C. Average SST for 1-10, 10-20, and 20-30 November was 15.2°, 16.3°,16.1°, respectively and 15.6 overall. At the **St. Georges Data Buoy** (46027), 8 nautical miles NW of Crescent City, CA (41.9°N) mean SST was 11.7°,10.4°,11.5° for 1-10, 10-20, 20-30, November, respectively, with an overall monthly mean of 11.1C°; historical monthly mean is 11.3-11.6 at 46027. At the **Tillamook Data Buoy** (46089), 85 nautical miles WNW of Tillamook, OR (46°N), historical November mean SST is 12.8-13.0. Mean SST was 14.5°,13.8°,13.3° for 1-10, 10-20, 20-30, with an overall monthly mean of 13.8C for November 2018.
https://www.ndbc.noaa.gov/station_page.php?station=46028

**WATER TEMPERATURES AT SHORE STATIONS**

At **La Jolla** (32.9°N), water temperature varied between 19 C° on the third and 17.5 °C on 30 November. Southern **Monterey Bay** (36.6°N), STWT was between 14.5°C and 15.5°C on the first, dropping to 12.7°C on the eighth, increasing again to 17°C on 22 November, then ending the month at 16°C. A similar November temperature pattern was recorded at **Arena Cove** (38.9°N), where STWT was between 11° and 11.8°C on the first, dropping to 9.6°C on 9 November, then increasing to a max of 13.5°C on the 23 November. then decreasing to 12°-13°C on 30 November.

**Neah Bay**, (48.4°N) STWT was 12.0-12.2°C on the first, dropping to a minimum 0f 8.7°C on 13 November, then increasing to 10.1°-10.4°C on 30 November.
https://tidesandcurrents.noaa.gov/stations.html?type=Physical+Oceanography

**EQUITORIAL AND SOUTH PACIFIC**
Neutral to positive SST anomalies persisted across Equatorial and tropical Pacific. El Niño-Southern Oscillation (ENSO) conditions remained low intensity. Upper ocean (0-300m) heat content anomaly from 180-100°W held positive, but decreased in November. Negative SST anomalies (>-2°C) occurred south of 40°S off the coast of South America, southwest of Australia, around the Antarctic continent and in the eastern Pacific at 15°S. Positive sea level anomalies (SLA) to 10 cm occurred across the equatorial Pacific and between 0°-30°S, west of 160°W.
http://www.ospo.noaa.gov/Products/ocean/sst/anomaly/
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ocean/weeklyenso_clim_81-10/wksl_anm.gif

The **NOAA OCEANIC EL NIñO INDEX (ONI)** (3-month running mean of SST anomalies in the Nino 3.4 region) was 0.7, an El NIño positive value, for OND**.** Five consecutive positive values indicate a fully developed El Niño event.
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf
**MULTIVARIATE ENSO INDEX (MEI)**
The October-November MEI increased to 0.70, surpassing the lowest El Niño ranking. The odds for continued El Niño conditions at least for some of the following six months has risen to about 67%. (updated 7 Dec) https://www.esrl.noaa.gov/psd/enso/mei/

The **NOAA / NCEI PACIFIC DECADAL OSCILLATION INDEX (PDO)** series calculated from ERSST.v4 data, has recently had ten consecutive negative or neutral PDO values, including -0.73 for November.
https://www.ncdc.noaa.gov/teleconnections/pdo/
http://research.jisao.washington.edu/pdo/PDO.latest.txt

**The PACIFIC / NORTH AMERICAN Teleconnection Index (PNA)**, computed from atmospheric pressure over the Pacific Ocean and North American Continent was near neutral, 0.22, in November. http://www.cpc.noaa.gov/data/teledoc/pna.shtml

During November 2018, the Bakun **ERD UPWELLING INDEX (UI)**, computed from monthly average sea level atmospheric pressure fields was low magnitude throughout the computation range (21°-60°N). Weak positive UI anomalies north of 39°N indicate residual influences of atmospheric High Pressure as winter develops and possibly an unseasonal upwelling tendency.
https://upwell.pfeg.noaa.gov/products/PFELData/upwell/monthly/table.1811
Positive and negative UI episodes were observed during November. At the 36°N computation point. Positive UI was seen during 3-6 November and negative conditions during 21-30 November.
http://upwell.pfeg.noaa.gov/products/current_gifs/upwell_122W_36N.txt

Six-hourly values for 42°N showed positive UI for 6-11 and 15-17 and negative values during 21-23 and 26-29 November
https://upwell.pfeg.noaa.gov/products/current_gifs/upwell_125W_42N.txt

**PRECIPITATION and RUNOFF** (Late November)
Rains came to the western U.S. near the end of November, after low rainfall in summer and fall. November and December storms in Southern California brought up to 200% of average to-date rainfall. Many rivers were temporally swollen during the last few days of November. The **Fraser River**, measured at Hope (130 km upstream from Vancouver, B.C.), was flowing at about at about 49,000 cubic feet per second (cfs), 80% of average discharge for November. https://wateroffice.ec.gc.ca The **Puyallup River at Puyallup**, Washington was flowing at 1,600 [1,900, approx. historical median: cfs in brackets]. The **Skagit River** was flowing at 27,000 [18,000 cfs] near Mount Vernon. The **Pend Oreille River** at Newport, Washington had a discharge of 15,500 [16,000 cfs] . The **Columbia River** at International Boundary was at 70,000 cfs and at The Dalles 112,000 cfs, both near seasonal median. The **Rogue River** in Oregon was flowing at 1,800 [2,300 cfs] at Grants Pass and 2,100 [4,500 cfs] at Agnees . In California, the **Trinity River** near Hoopa was 2,100 [2,000 cfs] and the **Klamath River** near Klamath was 8,000 [11,000 cfs]. At the **Battle Creek** Coleman National Fish Hatchery, the flow was 900 [300 cfs]. **Butte Creek** at Chico had discharge of 900 [200 cfs]. The **Sacramento River** was transporting. 13,000 [11,000 cfs] at Verona and 13,000 [15,000 cfs] at Freeport. **San Joaquin River** flow was 1,750 [1,900 cfs] at Vernalis.
https://waterdata.usgs.gov/ca/nwis/current/?type=flow
https://www.cnrfc.noaa.gov/awipsProducts/RNOWRKCLI.php=
https://wateroffice.ec.gc.ca/search/real_time_results_e.html

**NOTES**
In September rockfish and other species were feeding on **pelagic red crabs** (*Pleuroncodes planipes*) off central California. Additional sightings and occasional stranding occurred around southern Monterey Bay until November when a moderate stranding deposited the crabs 5-10 deep on the Pacific Grove shoreline in southern Monterey Bay. Photographs in local newspapers.
https://www.montereyherald.com/2018/11/15/a-carpet-of-crabs/
https://www.sfgate.com/local/article/red-crab-beach-lovers-point-pacific-grove-el-nino-13396006.php

The **commercial market squid** (*Doryteuthis opalescens*) fishery started relatively well in April, but was meager in both northern and southern California ports in summer and fall. However, the squid fishery began again in Monterey Bay in late November.
https://www.wildlife.ca.gov/Conservation/Marine/Pelagic/Landings

The commercial **Dungeness crab (***Metacarcinus magister*) harvest season opened 15 November in the area south of the southern boundary of the Bodega Head State Marine Reserve, Sonoma County (38.3°N). This restrictions off northern California were due to elevated concentrations of domoic acid in the viscera of some crabs north of 38.3°N. The crab harvest season was additionally delayed until 31 December due to crab maturity.
https://www.wildlife.ca.gov/Fishing/Ocean/Dungeness-Crab

https://www.wildlife.ca.gov/fishing/ocean/health-advisories

Because of the **extensive forest fires in central and southern California** during November 2018, runoff from the fire areas and fire smoke have added extensive solid materials to the rivers, lakes and ocean of California. The fire products of natural vegetation might be restorative under some conditions. However, larger burn-product loads may lower water quality and interfere with aquatic processes. Fire-remains of anthropogenic structures have not been analyzed or their impact assessed.

The interpretations in this report, assembling climate information, are those of the author (jgn) and may not be official positions of any part of NOAA or the Federal Government or any agency or person referenced. These reports DO NOT supersede or replace any State or Federal health advisory. If you have amplification or other comments on the topics listed, please send them to me. As you might note, I am not good at spotting errors, Your indulgence is appreciated.

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